

REMARKS/ARGUMENTS

Thorough examination and careful review of the application by the Examiner is noted and appreciated.

The examiner has objected to a margin informality in page 8 of the Specification.

The examiner has objected to the drawings under 37 C.F.R. 1.83(a) as not showing every feature of the invention specified in the claims.

The examiner has allowed subject matter in claims 1-15. The examiner has objected to informalities in claims 4-5, and 9-11. The examiner has rejected claims 16-19. By way of the foregoing amendments, claims 4-5, 7-14, 16-19 have been amended, and claims 20-25 have been newly added.

Accordingly, upon entry of this Response, Claims 1-25 are pending.

The changes in the specification, claims, and drawings do not introduce new matter but clarify matters shown and described in the application as filed. The foregoing amendments and following remarks are believed to be fully responsive to the Office Action mailed October 1, 2003 and render all currently pending claims at issue patentably distinct over the references cited by the Examiner. The foregoing amendments are taken in the interest of expediting prosecution and there is no intention of surrendering any range of equivalents to which Applicant would otherwise be entitled in view of the prior art. Reconsideration and examination of this application is respectfully requested in light of the foregoing amendments and the following remarks.

EXAMINER'S OFFICE ACTION

In the October 1, 2003 Office Action referenced above, the Examiner:

objected to the Specification, page 8 as having an insufficient upper margin;

objected to the drawings under 37 CFR §1.83(a) as not showing every feature of the invention specified in the claims;

objected to claim 4, 5, 9, 10, and 11 as having informalities;

rejected claims 16 under 35 USC § 102(b) as being anticipated by Masters, U.S. Patent No. 4,910,447 (hereinafter "MASTERS"); and

rejected claims 17-19 under 35 USC §103(a) as being obvious over MASTERS in view of Shacknow, U.S. Patent No. 3,585,477 (hereinafter "SHACKNOW").

Specification Objections and Amendments

On page, 2, clause 1 of the October 1, 2004 OA, Page 8 was objected to as having an insufficient upper margin, as a result, holes have been punched through the first line words. Examiner requested a substitute page 8 with sufficient upper margin. Accordingly, a substitute page 8 having a sufficient upper margin is attached after page 29 of this response, but before the attached annotated and replacement sheet of drawings appended to this response. Additionally, the original Specification, paragraph beginning on page 11, line 4, and ending on page 12, line 22 was amended and replaced by a replacement paragraph (see "Amendments to Specification", supra,) to include the following, inadvertently omitted reference numbers:

reference number "30" referencing "a diagnostic signal" shown in the Specification, page 11, line 20, and page 12, line 2;

reference number "32" referencing "a positive feed back assembly" shown in the original Specification, page 11, lines 21-22 and page 12, line 2;

reference number "34" referencing "a selectively energizable light assembly, shown in the Specification, page 12, line 3-4; and

reference number "36" referencing "a selectively energizable audio assembly", shown in the Specification, page 12, lines 4-5.

Objection to the Drawings

The drawings were objected to under 37 CFR §1.83(a) as not showing every feature of the invention specified in the claims. In particular, examiner requested that "the audio generator (claim 7), the visual generator (claim 8), a light (claims 13, 18), a sound device (claims 14, 19) and a positive indication (claim 17) must be shown or the feature(s) canceled from the claim(s)." Accordingly a proposed drawing correction, eliminating the word "OUTPUT" after the diagnostic portion 18, and instead, showing a reference number "30" indicating the "output" of the diagnostic portion "18" as "a signal indicative of undesired torque generation", as claimed in original claim 1, i.e., as a "diagnostic signal" defined in the Specification, page 11, lines 20-22 is shown in the appended annotated sheet and replacement drawing sheets. Also, the positive feedback assembly 32 and associated reference number and lead line are now shown as receiving the diagnostic signal 30 in the proposed drawing correction sheets as defined in the Specification, page 11, lines 21-22.

Additionally, the optional "selectively energizable light assembly" 34 having an associated reference number and lead line, shown in the Specification, page 12, line 3-4, and the "selectively energizable audio assembly" 36 having an associated reference number and lead line, shown in the Specification, page 12, lines 4-5 are now shown disposed within the positive feedback assembly 32 in both the appended annotated sheet and replacement drawing sheets.

With regard to claim 17, claim 17 has been amended to define a step of activating a positive feedback assembly as defined in the Specification, page 11, lines 19-25 through page 12, line 1. The positive feedback assembly 32 is now shown in FIG. 1.

With regard to claims 8, 13, and 18, claims 8, 13, and 18 have been amended to further define a positive feedback assembly having a "light assembly" as defined in the Specification, page 12, line 4.

Additionally, with regard to claims 7, 14, and 19, claims 8, 14, and 19 have been amended to further define a positive feedback assembly having an "audio assembly" as defined in the Specification, page 12, line 5.

With regard to claim 12 from which both amended claims 13 and 14 depend, claim 12 has been amended to clearly define a signal indicative of an undesired condition, as defined in the Specification, page 11, lines 24-25, through page 12, line 11, and to define a positive feedback assembly, as defined in the Specification, page 11, lines 21-22.

Thus, the objections to the drawings based on the drawings lacking the features claimed in claims 7-8, 13-14, and 17-19 have been obviated. Thus, with this in view, applicant respectfully submits that the objections to the drawings be withdrawn.

Claim Objections based on Informalities

Claims 4, 5, 9, 10, and 11 are objected to based on the following informalities:

- (a) Claim 4, line 3, the recitation "said signal" is unclear. Claim 1 defines four different type of signals, one is on line 4 the "torque request signal", another one on line 6 "a signal", a third one on line 7 "a voltage signal" and a fourth one is on line 10 " a signal indicative of undesired torque generation". Thus which "said signal" is being referred is unclear.
- (b) Claim 5, line 1, the recitation "said signal" has the same problem as that of claim 4.
- (c) Claim 9, lines 8-9, the recitation "said predetermined electrical current signal" lacks proper antecedent basis. Line 6 defines "an electrical current signal" not "a predetermined electrical current signal".
- (d) Claim 10, line 2, the recitation "said certain voltage value" and line 3, the recitation "said certain second voltage value" lack proper antecedent basis. Claim 9, line 5 defines "a predetermined voltage value", lines 9-10 defines "a predetermined second voltage value". Claim 9 uses the word "predetermined" not the word "certain".

(e) Claim 11, line 2, the recitation "said certain voltage value" lacks proper antecedent basis for the same reason as that of claim 10.

Accordingly, claims 4-5, 8-9, and 11 have been amended to correct any informalities, thereby obviating Examiner's objections. With regard to claim 4, claim 4 has been amended to clearly define "said signal" as "**said signal indicative of undesired torque generation**". Thus, the objection of the informality present in the original claim 4 has been obviated. Similar to claim 4, claim 5, has also been amended to clearly define "said signal" as "**said signal indicative of undesired torque generation**". Thus, the objection of the informality present in the original claim 5 has been obviated.

With regard to claim 9, on OA, page 2, clause 2, Examiner stated that in lines 8-9, the recitation "said predetermined electrical current signal" should be changed to -said electrical current signal--; and that in Line 12, the recitation "said predetermined second value" should be changed to -said predetermined second voltage value--. Claim 9 was amended in accordance with Examiner's suggestions.

With regard to claim 10, on OA, page 2, clause 2, Examiner stated that in Claim 10, line 2, the recitation "said certain voltage value" and line 3, the recitation "said certain second voltage value" lack proper antecedent basis. Claim 9, line 5 defines "a predetermined voltage value", lines 9-10 defines "a predetermined second voltage value". Claim 9 uses the word "predetermined" not the word "certain". Thus, Claim 10 was amended to clearly define "said predetermined voltage value" and "said predetermined second voltage value"

having antecedent basis as claimed in amended Claim 9, thereby obviating objections to Claim 10.

With regard to claim 11, on OA, page 2, clause 2, Examiner stated that in Claim, line 2, the recitation "said certain voltage value" lacks proper antecedent basis for the same reason as that of claim 10. In light of the antecedent basis provided in amended claim 10, claim 11 has been amended to define "said predetermined voltage value". Additionally, "said certain threshold value" was amended to define "said certain condition threshold value" as claimed in claim 10 from which claim 11 depends.

The claims having the terms in question have been amended to clearly define any uncertainties and to correct any informalities. Thus, the objection is believed to be obviated. With this in view, applicant respectfully submits that the objections to claims 4, 5, 9-11 be withdrawn.

Claim Rejections Under 35 USC § 102(b)

Claims 16 are rejected under 35 USC § 102(b) as being anticipated by Masters, U.S. Patent No. 4,910,447 (hereinafter "MASTERS"). The rejection of claim 16 under 35 USC § 102(b) based on MASTERS is respectfully traversed. The MASTERS reference teaches a system and method to control a motor by deactivating a motor when one of four failure modes occur 1) a MOSFET transistor power switch 16 fails when a short circuit occurs, 2) a control voltage 70 rises above a predetermined maximum, 3) a motor 18 overspeeds; or 4) a bridge circuit fails or a d.c. current is excessively rippled. See MASTERS, col. 5, lines 24-32. Additionally, the MASTERS reference teaches use of a potentiometer 131 that is mechanically adjusted to control voltage to a motor. See MASTERS, FIG. 1,

and EXAMINER's description page 3 of OA, under "Masters teaching".

The present invention generally directed to a method of providing automatic torque control within an electric drive assembly and generating a signal indicating an undesirable torque when an undesired amount of torque is being produced by the electric drive assembly. See Pending Application, amended Claims 16, and 20-21.

Amended independent Claim 16 was amended to define a method for controlling torque within an electric drive assembly having the step of:

generating a signal indicative of undesired torque when the existence of a certain operational state is ascertained.

Support for amending claim 16 is found in is found in page 11, lines 19-25 through page 12, line 1 as follows: "Should these compared voltage values differ by at least a certain amount, a diagnostic signal is generated by the controller 12 to a selectively energizable or activatable positive feed back assembly, effective to activate the positive feedback assembly and to notify an operator or user of the assembly 10 that a certain operational state (e.g., a state in which an undesired amount of torque is being produced) is occurring within the assembly 10.".

Unlike the motor in the MASTERS reference which automatically deactivates the motor upon occurrence of a failure mode, , the electric machine 28 of the present invention is not necessarily automatically deactivated using the present invention if an undesirable torque signal is

detected. When an undesirable torque signal is detected using the method of the present invention, a positive feedback or diagnostic signal 18 is provided to a positive feed back assembly 32 to notify an operator of the undesirable torque condition. Thus, the operator can then intervene to decide how to correct the generated undesirable torque signal. No such feature or limitation is provided in the MASTERS reference.

Additionally, claim 20 is newly added. Similar to the claimed features of amended claim 16, claim 20 defines a method for controlling torque within an electric drive assembly having the step of:

generating a signal indicative of undesired torque generation when an undesired amount of torque is being produced by said electric drive assembly.

Support for adding Claim 20 is found in is found in page 11, lines 19-25 through page 12, line 1. The same arguments regarding novelty of Claim 16 over MASTERS apply to newly added independent claim 20. The MASTERS reference does not teach or suggest the features of amended claim 16 or newly added claim 20. Clearly, the device and methods disclosed in the MASTERS reference does not anticipate the claimed invention. Thus, the MASTERS references fails to disclose, teach, or suggest a method having the step of "**generating a signal indicative of undesired torque when the existence of a certain operational state is ascertained [i.e., undesired torque is generated]**" as is provided by the present invention. Thus, because MASTERS fails to provide every feature of the invention as claimed in amended claims 16 and 20, MASTERS does not anticipate claim 16 and 20, and claims depending therefrom, under 35 USC §102(b) .

Therefore, the rejections under 35 USC § 102(b) have been obviated.

Claim Rejections Under 35 USC § 103(a)

Claims 17-19 are rejected under 35 USC §103(a) as being obvious over MASTERS in view of Shacknow, U.S. Patent No. 3,585,477 (hereinafter "SHACKNOW"). The rejection of claims 17-19 under 35 USC § 103(a) based on MASTERS in view of SHACKNOW is respectfully traversed. SHACKNOW is directed to a motor speed control device that activates an alarm during occurrence of either an active failure, indicated by a steady state output, or a passive failure. See SHACKNOW, col. 2, lines 34-41. Clearly, the methods disclosed in the MASTERS reference do not anticipate the claimed invention of claims 16 and 20, and similarly, do not anticipate the claimed invention of claims 17-19, which depend from claim 16, and 21-24, which depend from claim 20, respectively.

Like the MASTERS reference, the SHACKNOW reference fails to disclose, teach, or suggest a method as claimed in amended claim 16, and 20 of the present invention providing the step of: **generating a signal indicative of undesired torque when the existence of a certain operational state is ascertained [i.e., undesired torque is generated]**". Thus, adding the SHACKNOW reference to the MASTERS reference does not render the claimed invention obvious. Thus, the MASTERS and SHACKNOW references fail to disclose, teach, or suggest a clearly defining the steps of a method for controlling torque within an electric drive assembly using the claimed features of claims 16 and 20 of the present invention. Additionally, there is no motivation to combine MASTERS with SHACKNOW alone or in combination to render applicant's invention. If MASTERS were combined with SHACKNOW, the combination would still

automatically shut off a motor that was operating in a predefined failure mode (see MASTERS) and indication of such a failure to an operator as provided in SHACKNOW would still not allow for continuous operation of the MASTERS device.

Unlike the MASTERS/SHACKNOW combination, the present invention can continue to operate while providing a signal to an operator or user of the electric drive assembly when an undesirable torque, not a complete motor failure, is detected. The limitations as claimed in amended claims 17, 18, and 19 are not provided in either the MASTERS or the SHACKNOW references. With regard to claim 17, Claim 17 was amended to particularly define the step of activating a positive feedback assembly to notify an operator of said electric drive assembly of undesirable torque generation when said signal indicative of undesired torque is generated. Support for amending claim 17 is found in page 11, lines 19-25 through page 12, line 1. With regard to Claim 18 , Claim 18 was amended to particularly define the step of energizing a light assembly. Support for amending claim 18 to define the step of energizing a light assembly is disclosed in Pending Application, page 23, lines 3-4. With regard to Claim 19 , Claim 19 was amended to particularly define the step of energizing an audio assembly. Support for amending claim 19 to define the step of energizing a light assembly is disclosed in Pending Application, page 23, lines 4-5. With regard to Claim 21, which depends from Claim 20, Claim 21 was added to define a method having the steps of:

providing an electric drive assembly having a torque generator, an inverter assembly which is coupled to said torque generator, a current regulator which is coupled to said inverter assembly, and a controller which is coupled to said current regulator;

receiving a torque request signal;
using said controller to select a certain value
associated with said torque request signal;
producing a voltage signal having a certain
amplitude attribute and a certain phase angle attribute
in response to said received torque request signal, and
comparing at least one of said attributes of said
voltage signal with a selected certain value.

Support for adding claim 21 is found in FIG. 1, beginning page 10, line 4 and ending page 13, line 8. In general, the controller 12 of the present invention operates to automatically provide a desired torque to a motor (see Pending Application, page 3, lines 14-18). Thus, the present invention uses a feed back control loop 27 to dynamically modify torque produced through use of the controller 12 in combination with the inverter assembly 20, 22, and 24. See Pending Application, beginning on page 10, line 4 and ending page 13, line 8; see also Pending Application, FIG. 1. The Examiner equates use of the potentiometer 131 in masters with the automatic torque control request provided by the controller of the present invention. The MASTERS potentiometer 131 receives a predefined speed setting from a user, whereas, the torque control request of the present invention is modified by a feed back control loop 27 and is also automatically communicated to the controller 12 for further torque control, thereby allowing for dynamic speed control. Additionally, no such signal modification for torque control is taught, disclosed, or suggested in the SHACKNOW reference. Thus, none of the features of the method of controlling torque within the automatic drive system, as defined in claim 21 are provided alone or in combination in either the MASTERS or the SHACKNOW references.

Claim 22, which depends from claim 21, was added to define the step of using the controller to generate said signal indicative of undesired torque generation. Support for adding claim 22 is disclosed in Pending Application, page 11, lines 20-21.

Claim 23, which depends from claim 22, was added to define the step of: selectively activating a positive feedback assembly when said signal indicative of undesired torque generation is generated by said controller. Support for adding claim 23 is disclosed in Pending Application, page 11, lines 20-23.

Claim 24, which depends from claim 23, was added to define the step of: generating said signal indicative of undesired torque generation only when the difference between said at least one attribute of said voltage signal and said selected certain value is greater than a predetermined value.

Support for adding claim 24 is disclosed in Pending Application, page 12, lines 8-14.

Independent Claim 25 was added to define a method for controlling an electric drive assembly having the steps of providing an electric drive assembly having a torque map portion, a model portion, a current regulator, and a diagnostic portion;

receiving a predetermined torque request in said torque map portion;

using said predetermined torque request to produce a predetermined electrical current value;

receiving said torque request in said model portion;

using said predetermined torque request to produce a predetermined voltage value;

providing a current regulator which receives an electrical current signal having a value which is substantially similar to said predetermined electrical current value;

producing a second voltage signal having a predetermined second voltage value;

comparing said predetermined voltage value with said predetermined second voltage value and

determining an existence of a certain condition based upon said comparison.

Support for adding claim 25 is found in the limitations claimed in original claim 9, and in FIG. 1. Neither the MASTERS nor the SHACKNOW references alone or in combination provide the features as claimed in newly added claims 22-24 which depend from claim 20, nor the features as claimed in newly added claim 25. Thus, the present invention, as set forth in the newly added claims 25 and 20, and the claims which depend from claims 20 are clearly distinct from the art of record.

Based on the above, it is respectfully submitted that the amended claims 4-5, 7-14, 16-19, and newly added claims 20-25 are in condition for allowance, which allowance is earnestly solicited. With respect to the remaining non-cancelled claims, all of which depend from claims 1, 9, 16, and 20 the fact that they claim additional elements or limitations also renders them allowable over MASTERS, and SHACKNOW which allowance is earnestly solicited. It is believed that the present invention as amended is novel and nonobvious over the reference relied upon by the Examiner.

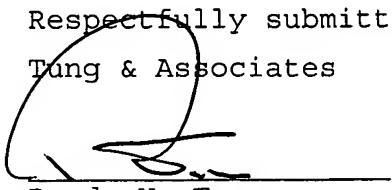
The rejection of claims 16 under 35 USC § 102(b) based on anticipation and claims 17-19 under 35 USC § 103(a) based on obviousness is obviated. A reconsideration for allowance of claims 16-19 is respectfully requested of the Examiner. Additionally, allowance of newly added claims 20-25 is respectfully requested of the Examiner.

Based on the foregoing, the Applicant respectfully submits that all of the pending claims, i.e. claims 1-25 are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

The Commissioner is hereby authorized to charge Deposit Account No. 06-1510 the amount of \$950.00 for the three month extension fee. Should any other fees or charges be due, the Commissioner is authorized to charge Deposit Account No. 06-1510 any further costs incurred.

In the event that the present invention is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicant's representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,
Tung & Associates



Randy W. Tung
Reg. No. 31,311
Telephone: (248) 540-4040